

REPORT FOR ISEI'S COLLABRATION PROGRAM

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Submitted by: Abida Farooqi

Submitted to: Prof. M.Kusakabe.

Title of study: Investigation of origin of High concentrations of Fluoride and Arsenic in ground waters, at south of Lahore Punjab, Pakistan.

Purpose of work:

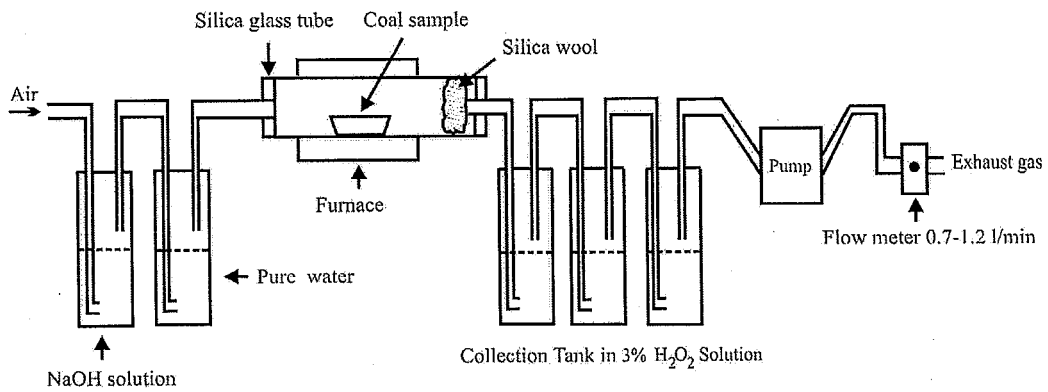
The analysis done under the directions of Prof. M.Kusakabe, take part in PhD project, whose aim is to understand the anthropogenic or natural origin of high fluoride(2-26mg/L) and Arsenic 20-1998ppb)concentrations reported in south of Lahore ,Punjab , Pakistan.

Hydrogen and Oxygen isotopes in the water molecule are an excellent and useful tool for understanding both the past and the present behavior of water circulation.

Work done at the institute of Earth's Interior, Okayama University:

Following work was done under the supervision of Prof. M.Kusakabe.

- Oxygen isotope ratios ($^{18}\text{O} / ^{16}\text{O}$) in ground water samples were measured by $\text{H}_2\text{O}-\text{CO}_2$ equilibration method using on line vacuum system attached to a mass spectrometer.
- SO_2 gas was prepared from BaSO_4 , precipitated from ground water samples, using sulfur line.
- Sulfur isotopes analysis was done on gas coming from the de-thermal decomposition of BaSO_4 precipitated, mixed with V_2O_5 and SiO_2 following the method described by Yanigasawa and Sakai (1983), using mass spectrometer.
- Coal samples were combusted using the apparatus as shown.



2 grams of sample was accurately weighed and used for combustion at 900°C. The resulting gases were oxidized in a 3% H₂O₂ solution to form sulfate ions. After oxidation, the solution was passed through a membrane filter and one milliliter of hydrochloric acid and 10 milliliters of barium chloride solution were added, while stirring constantly. The barium sulfate precipitate was digested for one hour at 90°C, recovered, and determined again by gravimetry.

- BaSO₄ obtained after combustion of coal was then converted to SO₂ gas using sulfur line .
- SO₂ gas obtained, was then analyzed for stable isotopes of sulfur using mass spectromter.